

## TWO SPECIES OF *CLINOPOGON* BEZZI (DIPTERA: ASILIDAE: STENOPOGONINAE) FROM SABAH, MALAYSIA

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**Abstract.**—The robber flies (Diptera: Asilidae) *Clinopogon nicobarensis* (Schiner) and *C. velatus*, n. sp., are reported from Sabah, Malaysia, on the island of Borneo. This is the first record of the genus from Borneo. The species are described and compared with congeners. This is the first publication of detailed illustrations of the terminalia of both sexes in *Clinopogon*. The importance of the terminalia for identification purposes is emphasized. An annotated species list of the genus is included.

**Key Words:** Diptera, Asilidae, *Clinopogon*, new species, terminalia, Sabah, Malaysia

*Clinopogon* Beazzi consists of small, gray-tomentose, densely pilose flies that inhabit vegetated zones of beaches (Hull 1962). The genus is poorly studied largely because of the dependency upon external anatomy and the failure to examine the terminalia. Hence, only eight species are known, scattered from Madagascar eastward to Fiji (Beazzi 1910, Hull 1962, Oldroyd 1975, Joseph and Parui 1984, Daniels 1989, Geller-Grimm Web Database 2004). Six of these were placed in other genera (Bigot 1878, 1879; Fabricius 1775; Schiner 1868; Walker 1849, 1861), but later transferred to *Clinopogon*. The remaining two species (Séguay 1955, Joseph and Parui 1984) were described more recently. Most species have limited distributions although five occur in Indonesia. *Clinopogon nicobarensis* (Schiner) is widely distributed, ranging from islands near Madagascar eastward to Taiwan. Recently, Geller-Grimm (2002) synonymized *C. sauteri* Beazzi with *C. nicobarensis* (Schiner) and illustrated the intact male terminalia. Of the remaining four, *C. barrus* (Walker 1849) is unconfirmed because the type is lost and the type locality of the species is unknown.

While searching through unsorted material collected by USNM colleagues in Sabah, Malaysia, on the island of Borneo, I found *C. nicobarensis* and an undescribed species. The species are described and the terminalia illustrated. The latter species increases the number to nine for the genus. This paper provides the first detailed illustration of the terminalia of both sexes, demonstrates the usefulness of the terminalia to determine species, and documents *Clinopogon* in Borneo.

### METHODS

Terminology mostly follows McAlpine (1981). Terms for terminalia and measurements follow Cannings (2002). 1) Body length is the linear distance from the anterior margin of the face to the extreme posterior of the abdomen, including the terminalia. Width measurements include head width, face width, vertex width, and oral margin width. 2) Head width is the greatest distance between the lateral margins of the eyes in anterior view. 3) Face width is the narrowest distance between the eyes below the antenna. Face-Oral margin Width Ratio

(FOMWR) and Face-Vertex Width Ratio (FVWR) are comparisons of divergence of the oral margin and vertex with the face; Face Head Width Ratio (FHWR) is a comparison of the width of the face and head. 4) Vertex width is the distance between the eyes along a line touching the posterior ocelli in dorsal view. Vertex-Head Width Ratio (VHWR) is a measurement of vertex divergence and head. 5) Oral margin width is the greatest distance of the face between the tentorial grooves. Oral Margin-Head Width Ratio (OMHWR) and Oral Margin-Vertex Width Ratio (OMVWR) are comparisons of divergence of the oral margin with the head and vertex. Key to abbreviations of structures in illustrations are given in the captions of Figs. 1–9. Specimens belong to the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM).

#### *Clinopogon* Bezzi

*Clinopogon* Bezzi 1910: 153. Type species *Clinopogon sauteri* Bezzi, by original designation. Hull 1962 (1): 110; Oldroyd 1975: 128; Daniels 1989: 342; Geller-Grimm 2004.

**Diagnosis.**—Distinguished from all other stichopogonine genera by a combination of the following characters: Medium to large flies, 10–22 mm long. Face with a prominent, dense, shieldlike mat of setae that extends dorsally to just below base of antenna. Palpus with second segment cylindrical, largely bare, apex oblique. Abdomen broad basally, somewhat flattened, and strongly tapered apically (Hull 1962). Hull (1962) gave a detailed description of the genus.

**Remarks.**—*Clinopogon* is closely related to *Stichopogon* Loew. They both have 1) the frons and face diverging widely above; 2) a long, dilated flagellum; and 3) tufts of white vestiture on the thorax (Hull 1962). The genus differs from known Oriental *Stichopogon* in the much larger body; the longer, more abundant pile of the body; and the absence of differentiated dorsocentral

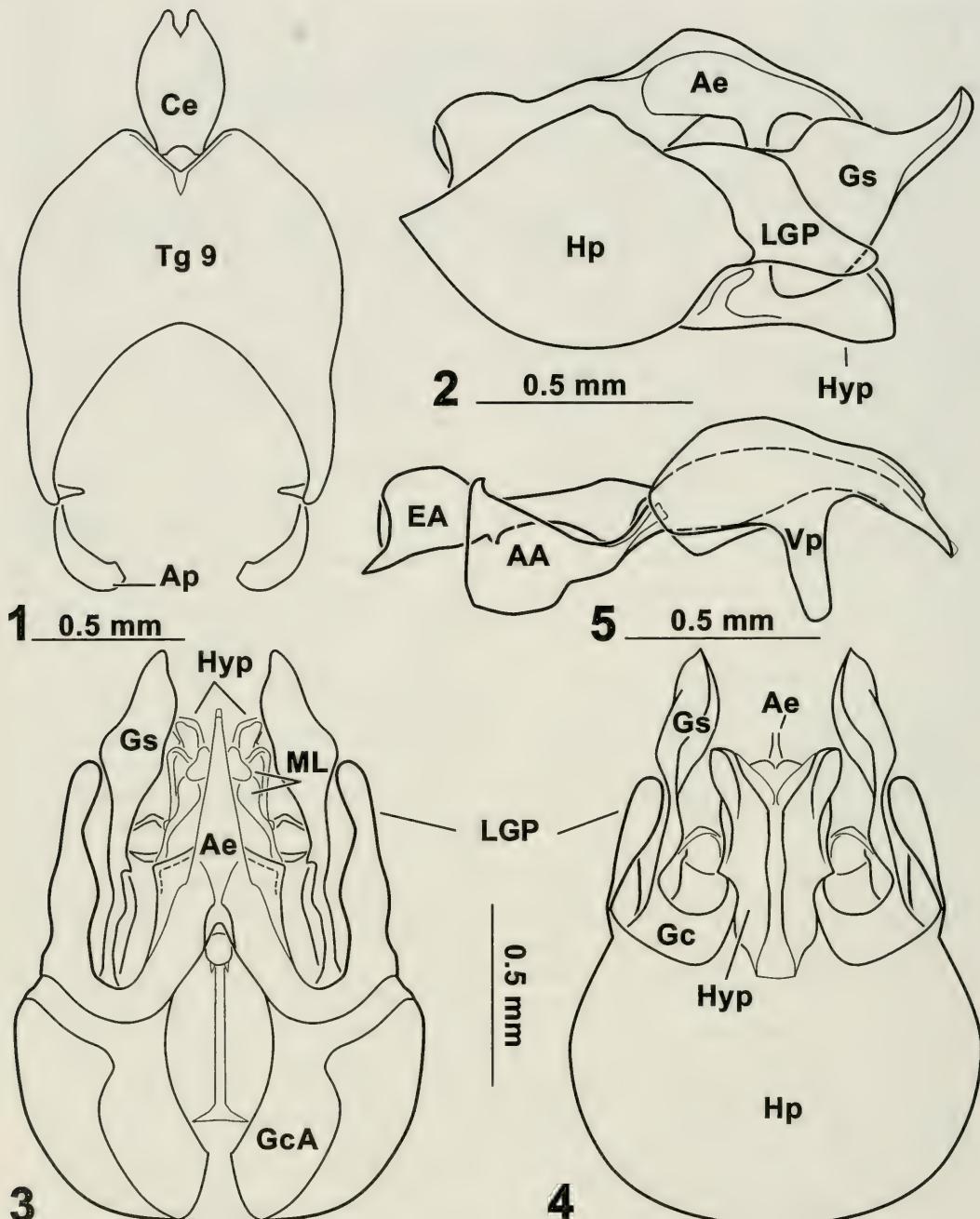
bristles, bands on the abdomen, and fused cerci.

This is the first time that the terminalia of both sexes of *Clinopogon* have been illustrated in detail. These illustrations support the use of the terminalia for identification purposes. To date, species descriptions have relied on external characters (tomentum, ground color, and vestiture patterns), which are mostly inadequate for accurate identification. *Clinopogon* species are so similar externally that identification is unreliable without dissection and detailed examination of the terminalia.

#### *Clinopogon nicobarensis* (Schiner) (Figs. 1–9)

**Redescription.**—**Male:** Black body, gray tomentose and white setose, setae thin, often wavy or proclinate apically. Body length 13.4–21.2 mm; FHWR 1/4.4–1/4.7; FVWR 1/2.2–1/2.3; FOMWR 1/1.7–1/1.8; VHWR 1/2.1–1/2.3; OMWR 1/1.2–1/1.3; OMHWR 1/2.6–1/2.7. **Head:** Face in profile slightly and gradually produced ventrally with dense, flat, shieldlike mat of facial vestiture extending from just below antennae to just before or to apex of proboscis; oral margin with a row of thin bristles. Palpus with basal segment tomentose and setose; apical segment cylindrical, mostly bare, with gray tomentum and white setae on basal half ventrally, apex angular with sparse setae. Proboscis blackish, mostly bare, scattered setae ventrally, basal third tomentose. Antenna with scape about as long as pedicel, combined length scape and pedicel one-third as long as flagellum; flagellum strongly compressed laterally, widest medially, tapered toward each end, 2.7× longer than wide; apex narrower than base, with minute segment and apical spine, combined length of latter one-sixth as long as flagellum. Frons strongly divergent dorsally. Ocellar setae thin, only as thick as frontal setae. Occiput with two to three pairs of stout, erect, white bristles; setae mostly long, those on ventral half of head dense.

**Thorax:** Black with gray tomentum and



Figs. 1-5. Male terminalia of *Clinopogon nicobarensis*. 1, Tergite 9 [= epandrium] and cercus, dorsal view. 2-4, Lateral, dorsal, ventral views. 5, Aedeagus, lateral view. Abbreviations: AA = aedeagal apodeme; Ae = aedeagus; Ap = epandrial apodeme; Gc = gonocoxite; Ce = cercus; EA = ejaculatory apodeme; GcA = gonocoxal apodeme; Hp = hypandrium; Gs = gonostylus; Hyp = hypoproct; LHP = lateral hypandrial process; ML = median lobe of gonocoxite.

white setae. Mesonotum  $3.5\times$  as long as high; narrow corner of postpronotum bare, ground color yellow to brownish yellow; postalar callus gray tomentose, yellowish brown to reddish; tomentum thin dorsally with faint wide longitudinal stripe medially, tomentum dense elsewhere; mesonotum with short, erect setae dorsally, longer and bristly laterally; dorsocentral bristles thin, undifferentiated, about as long as adjacent setae; 3 lateral bristles, only one supraalar bristle present. Scutellum flat dorsally, wider than long, somewhat rectangular with rounded corners; abundant long setae dorsally, as long as prescutellar setae; seven to eight pairs of marginal bristles laterally, only slightly thicker than setae. Pleuron with mats of long white setae on katepisternum anteriorly and posteriorly, on dorsal and posterior margins of anepisternum, and on anterior margin of anepimeron; posterior margin of anepisternum and katatergite with a row of bristles. Halter dull yellow, stalk and/or knob dull brown or blackish.

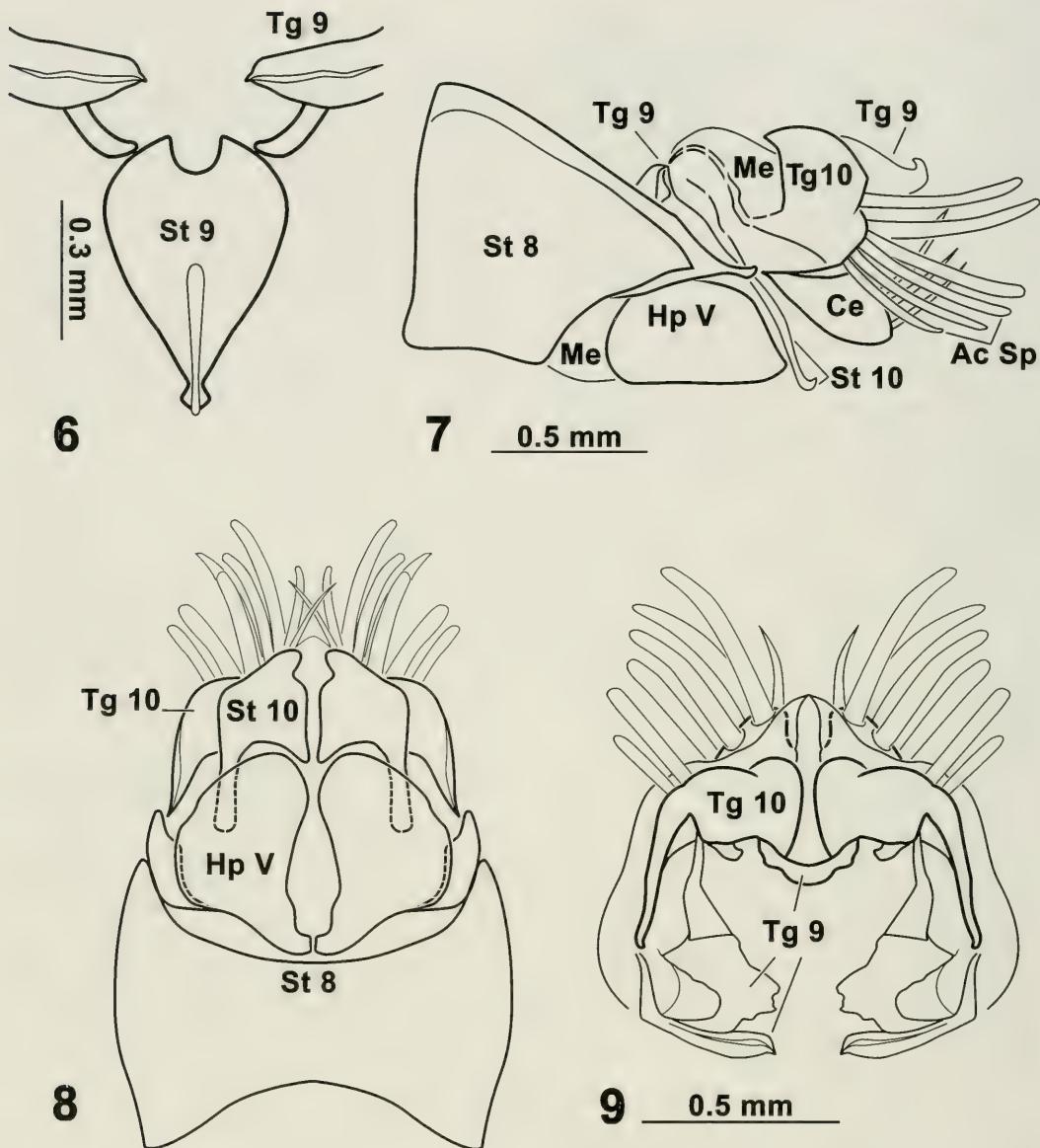
**Wing:** Wide basally, apex pointed, about as long as abdomen; veins brown, cell surface with abundant fine microtrichia, mostly brownish, costal and basal cells narrowly gray. Marginal cell open. Cell  $r_4$  trumpet-shaped, wide apically, base narrow, beyond apex of cell  $d$ ; base of vein  $R_4$  abruptly arched anteriorly, ending at wing apex. Cell  $m_3$  narrowly open, base with or without short stalk. Alula narrow.

**Legs:** Dark brown to black, white tomentose with fine, abundant, white setae and sparse white to slightly yellowish bristles. Coxae with a mat of long setae; femora ventrally and posteriorly and fore- and middle tibiae ventrolaterally with a fringe of abundant, long setae; hind tibia with sparse long setae, not especially abundant or forming a distinct fringe. Fore- and hind femora with an irregular row of stout dorsal bristles curving posteriorly; fore femur with row on apical third, that on hind femur extending from near base to apical fifth; stout anterior and preapical, posterodorsal bristle present on middle femur. Hind femur slightly con-

cave ventrally. Tibiae with white bristles only; apex of fore- and middle tibiae slightly bent inward and abruptly swollen along inner margin; hind tibiae with straight sides apically, not swollen or bent. Tarsi with black claws, latter mostly white tomentose, apex bare; pulvilli whitish to cream-colored, with sparse brownish streaks basally; empodium flat, bladelike on basal two-thirds, abruptly narrowed apically, setalike.

**Abdomen:** Segments as wide as thorax basally and somewhat flattened; tergite 1 without a swollen callus; ground color black, generally densely gray tomentose, somewhat thinner dorsally; vestiture white and slender, setae short dorsally, longer laterally, especially on basal three to four tergites and sternites 3–5 medially; tergite 1 with several long thin bristles present in apical corner; segment 8 about half as long as 7, sternite 7 strongly reduced, straplike basally. **Terminalia** (Figs. 1–5): Tergite 9 [epandrium] longer than tergite 8, hoodlike, with turned-down sides and abundant long, white setae concealing terminalia laterally; apical margin with V-shaped notch medially; short basal apodeme present. Cercus narrow, two-thirds as long as middorsal length of tergite 9, fused medially, strongly sclerotized; apex with narrow notch; surface gray tomentose with numerous long setae laterally, setae sparse dorsally. Sternite 8 gray tomentose basally; gonocoxite and hypandrium fused, complex; median lobe of gonocoxite elongate; lateral gonocoxal process long, digitate dorsally, flat and pointed laterally; gonostylus elongate, clavate dorsally and ventrally, wide basally, narrow and pointed apically. Hypoproct moderately keeled, grooved medially, apex divergent; in lateral view its ventral edge is even with the ventral margin of the hypandrium. Aedeagus convex and narrow apically, gradually wider posteriorly; stout ventral process present.

**Female:** Body length 16.8–21.8 mm; FHWR 1/4.6–1/4.8; FVWR 1/2.2–1/2.4; FOMWR 1/1.7–1/2.0; VHWR 1/1.9–1/2.2; OMHWR 1/2.2–1/2.7; OMVWR 1/1.1–1/



Figs. 6-9. Female terminalia of *Clinopogon nicobarensis*. 6, Sternite 9 [genital fork]. 7-9, Lateral [tergite 8 removed], ventral, and dorsal views. Abbreviations: AcSp = Acanthophorite spines; HpV = hypogynial valve; Me = membrane; St8, 9, 10, = sternites 8, 9, 10; Tg9, Tg10 = tergites 9 and 10.

1.4. Body essentially identical to male except setae generally shorter. *Abdomen*: Segments 1-2 and 8 with long setae. Hypogynial valve oval, sometimes reddish, median fissure present. *Terminalia* (Figs. 6-9): Tergite 9 uniting acanthophorites dorsally. Acanthophorites with 8-9 pairs of long, black or yellowish spines. Cercus often

with spines. Sternite 9 (genital fork, furca) with shallow notch apically, entirely strongly sclerotized, base narrow with a raised carina. Sternite 10 asymmetrically capitate. Spermathecae thin, convoluted in a loosely organized 'ball' within segment 8, surface simple and without noticeable microstructures; each spermatheca separated basally,

not joining and forming a common duct, diameter at base wide, tubes narrow gradually to simple valve, diameter beyond valve about one-eighth that at base, apex only slightly wider. Accessory glands simple, flaccidlike sacs, gradually widened apically, and without distinctive characters.

Material examined.—MALAYSIA: 4 ♂, 4 ♀, Sabah; Tanjung Aru Beach/29.viii.1983/G. F. Hevel & W. E. Strainer (USNM).

Remarks.—*Clinopogon nicobarensis* is readily distinguished from congeners by the large body and combined characters of the terminalia (Figs. 1–9).

***Clinopogon velatus* Scarbrough, new species**

(Figs. 10–18)

Description.—Male: As *C. nicobarensis* except as follows. Body length 15.6–17.0 mm; FHWR 1/4.8–1/5.2; FVWR 1/2.2–1/2.3; FOMWR 1/1.8–1/1.9; VHWR 1/1.8–1/2.1; OMHWR 1/2.1–1/2.5; OMVWR 1/1.1–1/1.2. Terminalia (Figs. 10–14): Tergite 9 with wide, concave apical notch. Cercus about as long as middorsal length of tergite 9; wide, deep apical notch present. Gonostylus with wide, flat, asymmetrical club apically; abundant bristly setae present dorsally. Paired median lobes of gonocoxite forming stout, arched bar in dorsal view, each fused in membrane below aedeagus and with stout podiform flange anteriorly; lateral gonocoxal process short with round apex in dorsal view, constricted preapically, wider and pointed in lateral view; obvious line of fusion of gonocoxite and hypandrium absent in lateral view. Hypoproct strongly keeled, projecting well below hypandrium ventrally, apex parallel, not strongly divergent. Aedeagus stout, wide apically; stout ventral process absent.

Female: As *C. nicobarensis* except as follows. Body length 13.0–16.0 mm; FHWR 1/4.6–1/4.8; FVWR 1/2.2–1/2.4; FOMWR 1/1.5–1/1.7; VHWR 1/2.0; OMHWR 1/2.9; OMVWR 1/1.2–1/14. Terminalia (Figs. 15–18): Acanthophorites

with five pairs of long, slender, black spines. Cercus with abundant, long, thin setae; spines absent. Sternite 9 (genital fork, furca) with large oval area apically, only slightly sclerotized. Sternite 10 slender, digitate.

Type specimens.—Holotype ♂, MALAYSIA: Sabah: 17 km S. Kota Kinabalu/9.viii.1983/G. F. Hevel & W. E. Strainer (USNM); allotype ♀, MALAYSIA: Sabah; Tanjung Aru Beach/29.viii.1983/G. F. Hevel & W. E. Strainer (USNM). Paratypes, 2 ♀, MALAYSIA: Sabah; Tanjung Aru Beach/20, 21.viii.1983/G. F. Hevel & W. E. Strainer (USNM); 1 ♂, MALAYSIA: same data as allotype (USNM).

Etymology.—Latin *velatus* for ‘hidden’, referring to the fact that I initially did not recognize it as a species separate from *C. nicobarensis*.

Remarks.—*Clinopogon velatus* differs from *C. nicobarensis* by its wide, concave, apical notch on tergite 9 and cercus, and the combined characters of the terminalia (Figs. 10–18), especially the strongly keeled, ventrally projecting hypoproct, the apically clubbed gonostylus bearing abundant dorsal setae, and the apically stout aedeagus.

WORLD SPECIES LIST OF CLINOPOGON

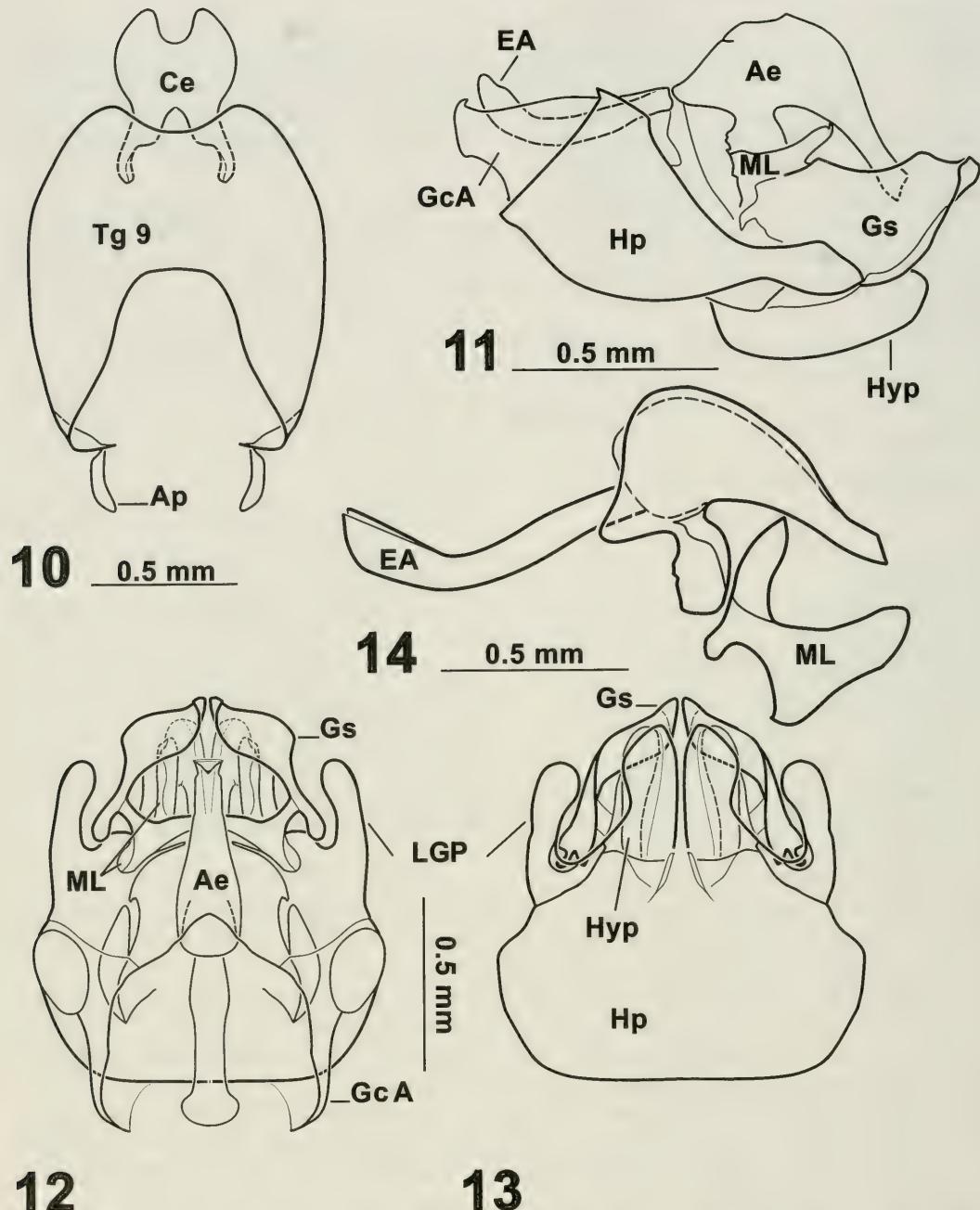
*C. barrus* (Walker) 1849: 353. Distribution: Malaysia. Type ♀ (*Dasypogon*), type locality?

*C. cinctellus* (Bigot) 1879: 440. Distribution: Indonesia, Maluku. Type ♂ (*Stichopogon*), type locality Tidore, Moluccas (Maluku).

*C. congressus* (Walker) 1861: 147. Distribution: Indonesia (Irian Jaya, Sulawesi, Maluku, Java). Type ♂ (*Dasypogon*), type locality Sulawesi (Tidon).

*Stichopogon albicapillus* Wulp 1872: 147 Type ♀, type locality Indonesia (Java).

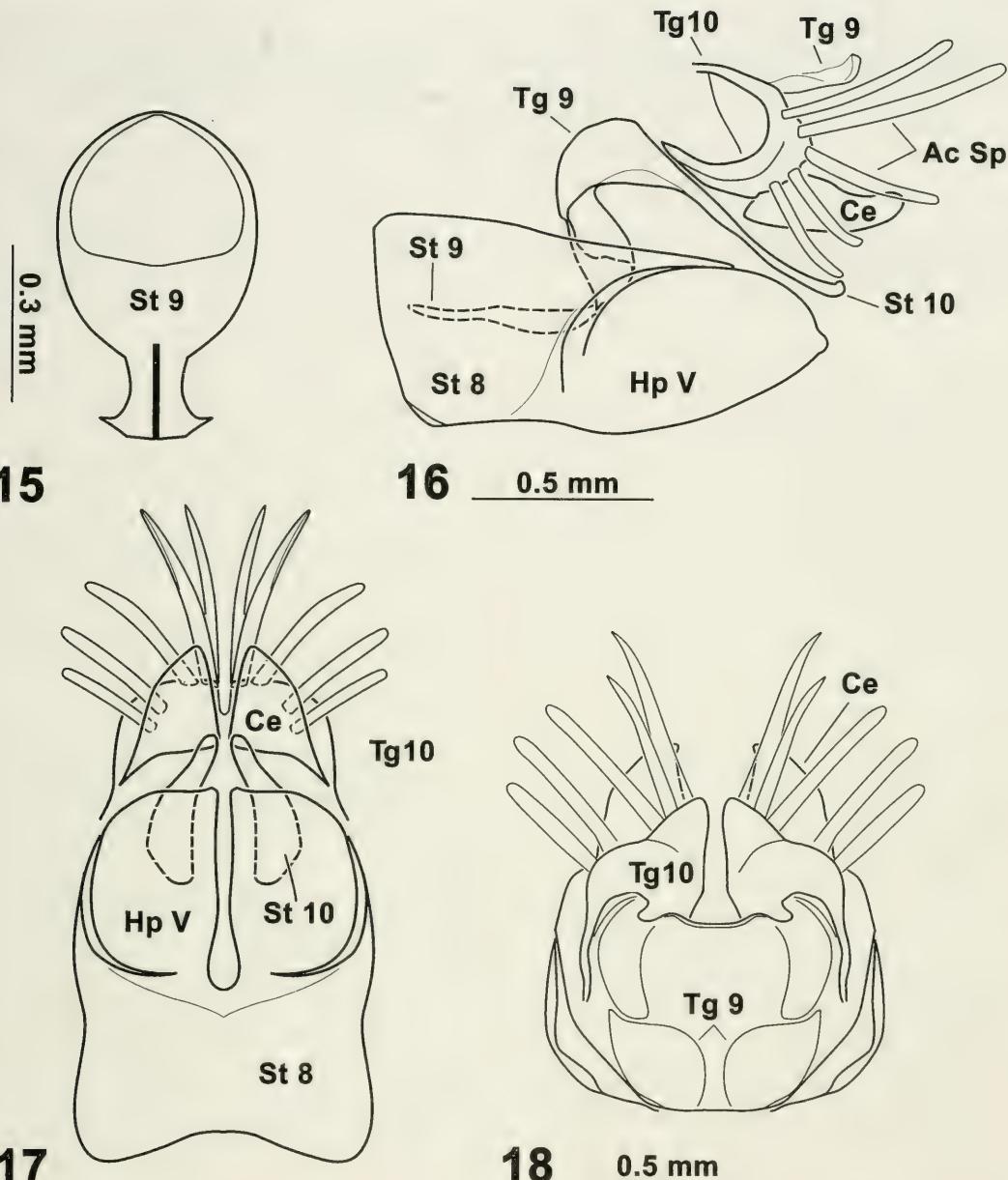
*C. nicobarensis* Schiner 1868: 161. Distribution: India, Madagascar, Egypt, Mascarene Islands, Philippines, Nicobar Island, Malaysia (Sabah), Taiwan, Yemen (Socotra Archipelago). Type ♀ (*Stichopogon*).



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Figs. 10-14. Male terminalia of *Clinopogon velatus*. 10, Tergite 9 [= epandrium] and cercus, dorsal view. 11-13, Lateral, dorsal, and ventral views. 14, Aedeagus, lateral view.



Figs. 15–18. Female terminalia of *Clinopogon velatus*. 15, Sternite 9 [genital fork]. 16–18, Lateral [tergite 8 removed], ventral, and dorsal views.

*pogon*), type locality Nicobar Islands (Kondul).

*Clinopogon sauteri* Bezz 1910: 153. Type ♂, type locality Taiwan (Takao).

*C. odontoferus* Joseph and Parui 1984: 55. Distribution: Sri Lanka. Type ♂, type lo-

cality Sri Lanka (Kandy District, Peradeniya).

*C. plumbeus* (Fabricius) 1775: 793. Distribution: Australia. Type? (*Asilus*), type locality Nova Hollandia (Australia, Queensland).

*C. reginaldi* (Séguy) 1955: 10. Distribution: Tromelin Island, Madagascar. Type? (*Stichopogon*), type locality Madagascar (Tromelin Island).

*C. scalaris* (Bigot) 1879: 440. Distribution: Fiji. Type? (*Stichopogon*), type locality Fiji.

*C. velatus* Scarbrough, new species. Distribution: Malaysia (Sabah). Type ♂, type locality Malaysia (Sabah).

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